



# Technology Maturity for the HabEx Observatory Concept

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and the HabEx Design Team

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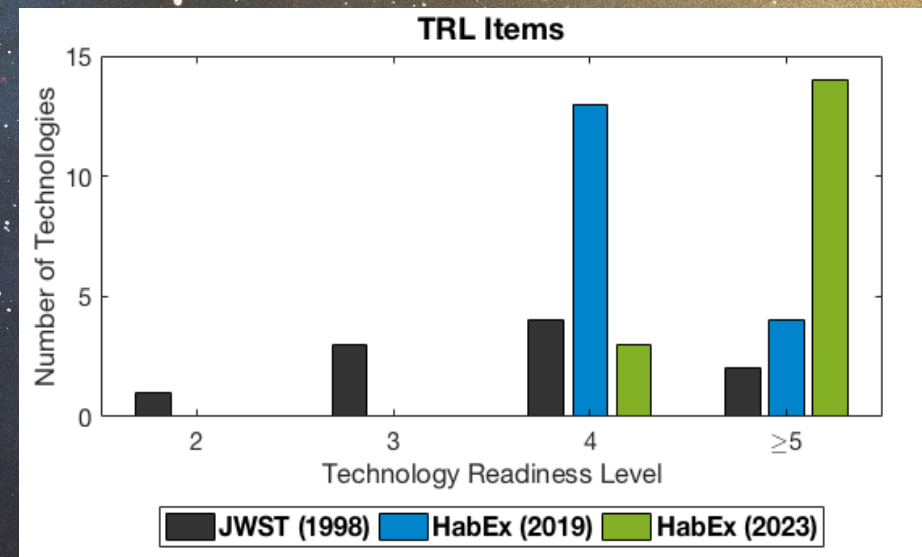
# Technology Items

Starshade: 5

Instruments: 8

Telescope: 3

Spacecraft: 1





# HabEx

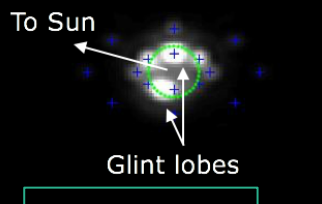
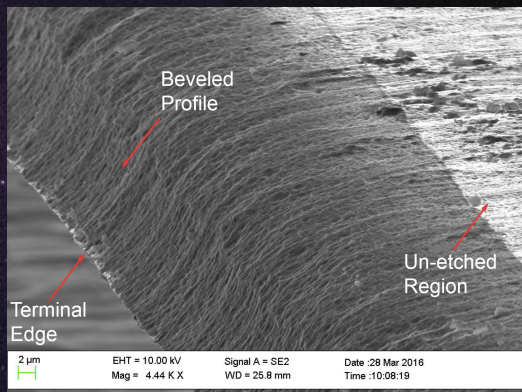


# Starshade Deployment





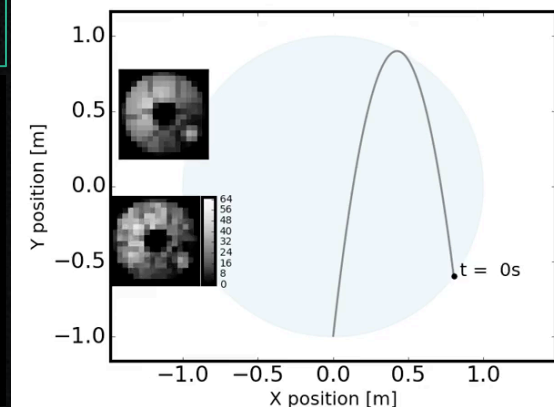
## Starlight Suppression



**TRL 5**  
summer 2019

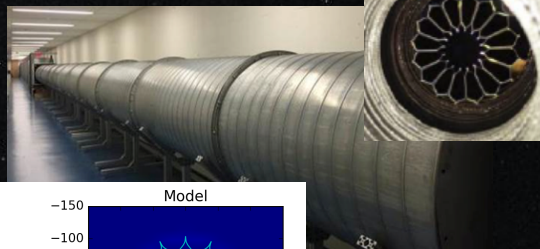
## Formation Sensing

**TRL 5**



## Controlling Scattered Sunlight

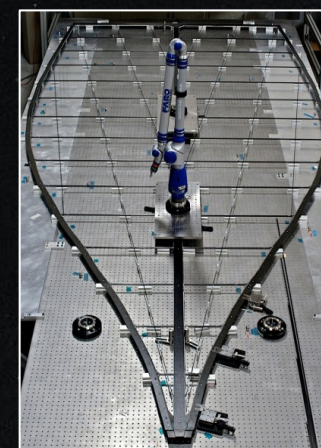
**TRL 5**  
January 2020



## Deployment Accuracy and Shape Stability

## Lateral Formation Sensing

**TRL 4**

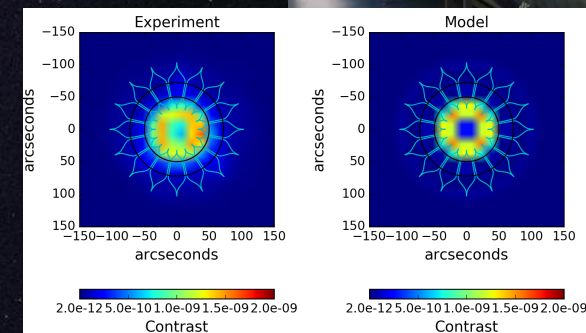


**TRL 4**

## Petal Positioning Accuracy and Opaque Structure

## Petal Shape And Stability

## Contrast Performance and Model Validation





# HabEx

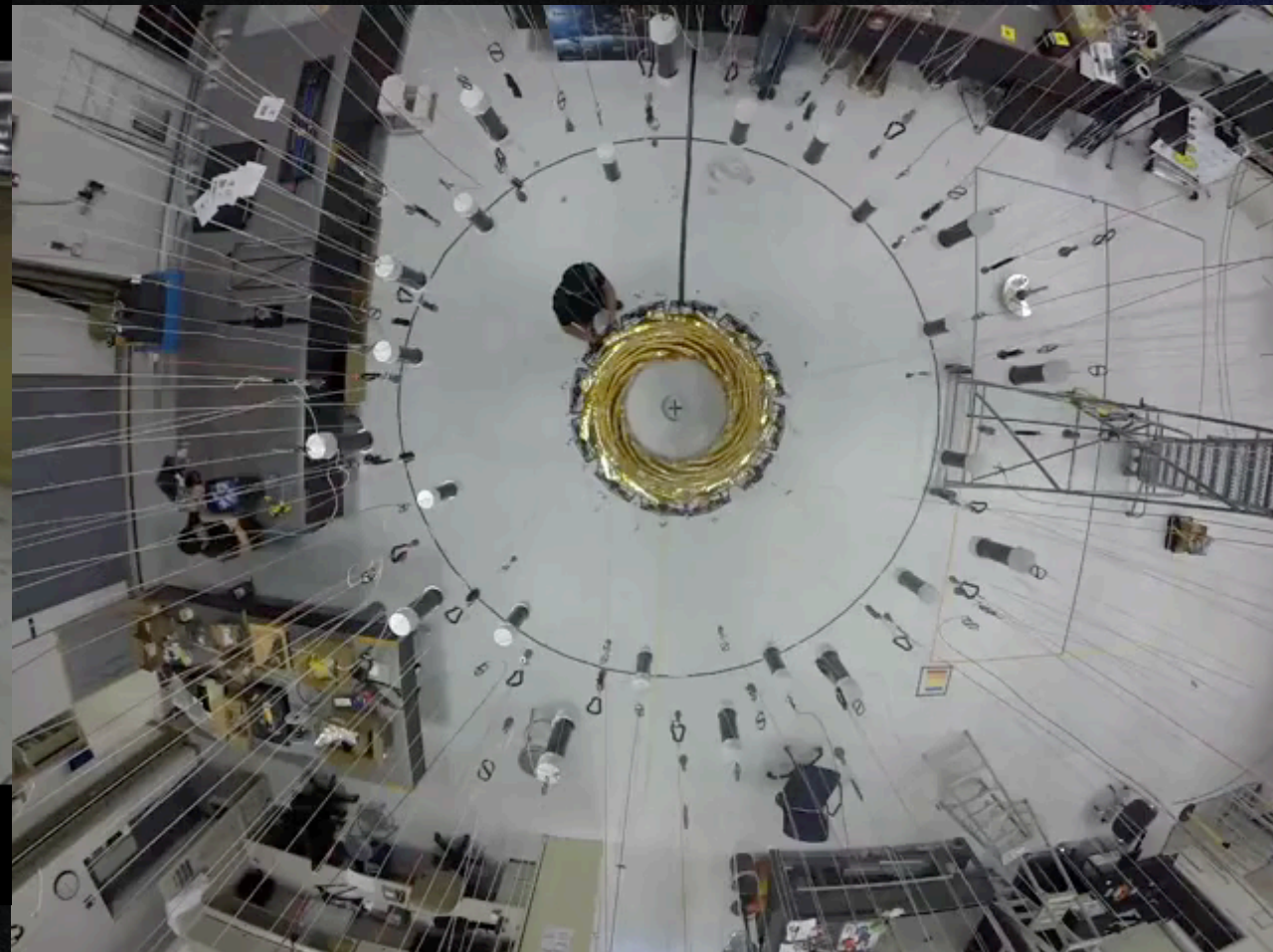


## Truss Deployment Test



Demonstration of starshade development model

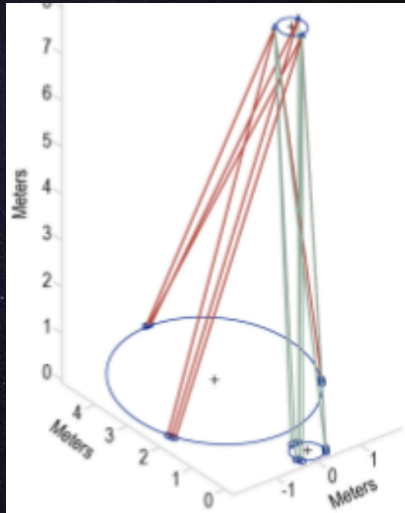
$\frac{1}{4}$  scale for HabEx



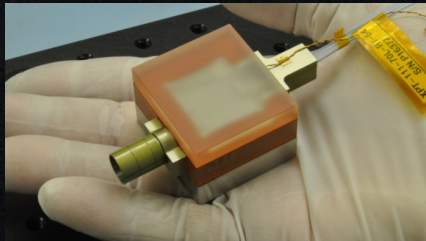




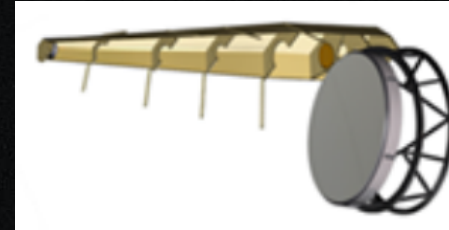
### Laser Metrology



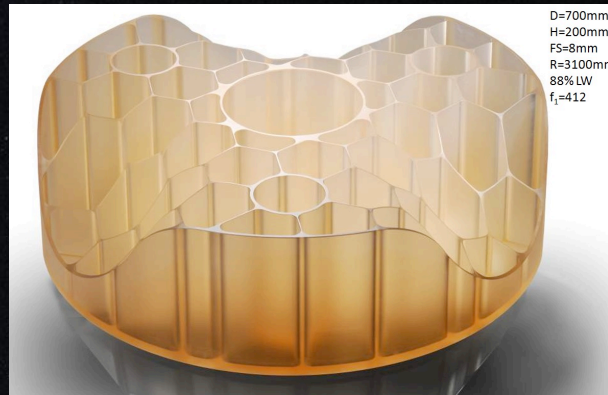
Laser Metrology System: Beam launcher, ring laser, and phase meter



TRL 5



### Large Monolith Mirrors



Large Monolith Mirror Fabrication



### Microthrusters

TRL 5



ESA/LISA Pathfinder



2.4 m Coating Chamber

TRL 4

Coating Uniformity

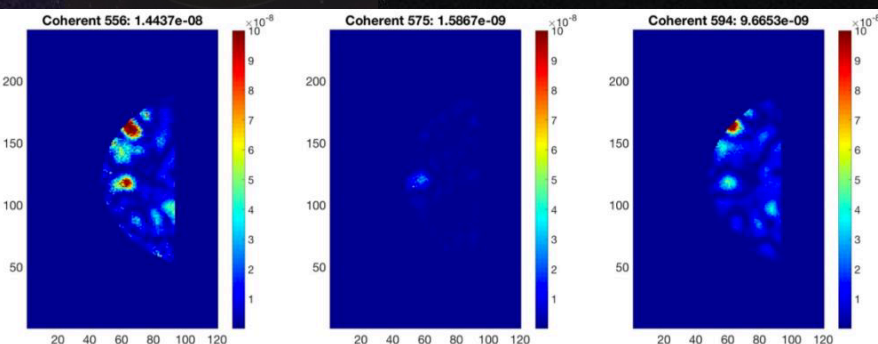




### Contrast



TRL 4



Coronagraph Architecture



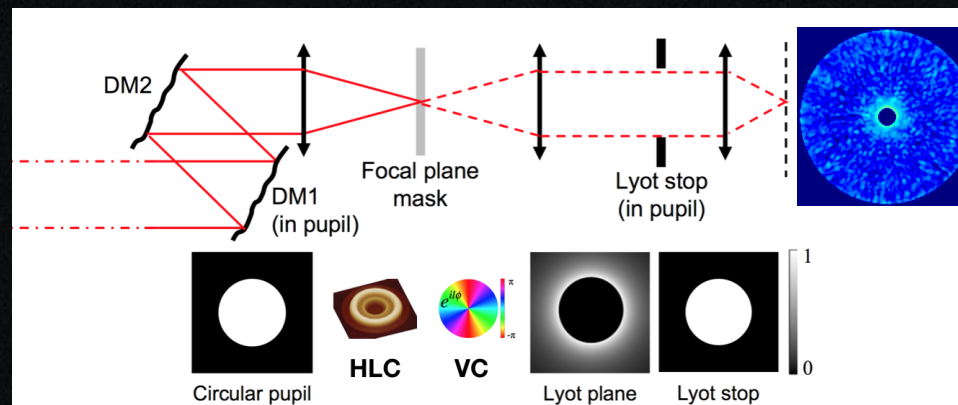
48x48 WFIRST



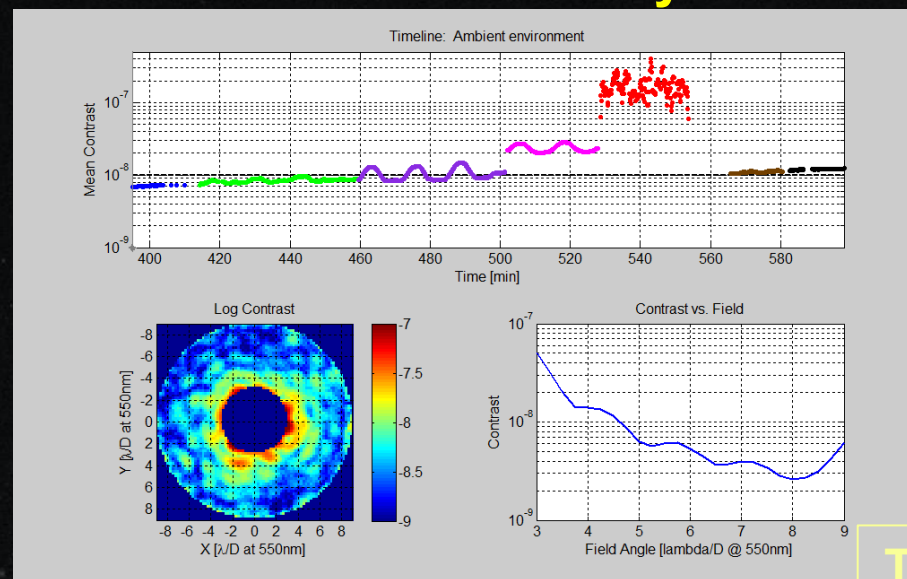
TRL 4

64x64 MEMS

Deformable Mirrors

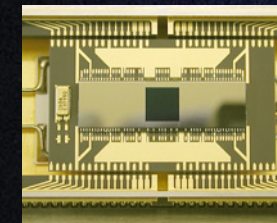
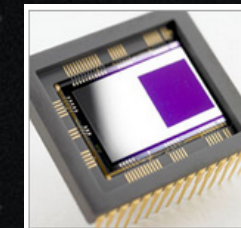


### Contrast Stability



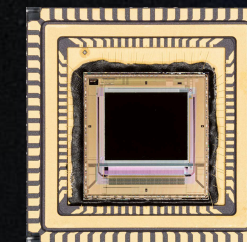
Low-Order Wavefront Sensing and Control

### Detection Sensitivity



TRL 4

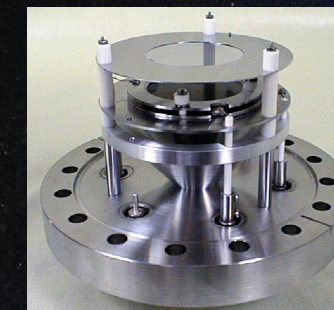
Ultra-low Noise UV and Visible EMCCD



TRL 5  
320x256

TRL 4  
1k x 1k

LMAPD NIR photon counting



TRL 4

Microchannel Plate Detector for UVS<sub>7</sub>

TRL 4